January 6, 1881.

THE PRESIDENT, followed by General STRACHEY, V.P., in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "Researches on the Minute Structure of the Thyroid Gland." By E. CRESSWELL BABER, M.B. Lond. Communicated by E. E. KLEIN, M.D., F.R.S. Received November 25, 1880.

(Abstract.)

This research, which is a continuation of one previously communicated to the Society,* is based on an examination of this organ in the dog, cat, horse, rabbit, ox, sheep, seal, pigeon, fowl, rook, tortoise, frog, skate, and conger-eel. The research has been carried on under the direction of Dr. Klein, and the following are the chief conclusions which have been arrived at:—

(1.) *Vesicles.*—Although branched vesicles may be present, the gland-vesicles in the thyroid of adult animals, according to the author's observations, form closed cavities, which are not in communication with one another to any extent. Much-branched vesicles, which have been observed in the glands of young dogs, are considered merely as forming a stage in the growth of the gland, and as indicating that an increase in the number of vesicles is taking place. In the thyroid gland of the conger-eel, small vesicles (containing colloid) are frequently observed in the walls of large ones, and from the appearances they present it is probable that the walls separating the cavities of the large and small vesicles sometimes become flattened out and give way, allowing the contents of the two vesicles to commingle.

(2.) *Epithelium, Reticulum, and Basement-Membrane.*—Whilst the shape of the epithelial cells of the vesicles varies much in different animals, the general tendency of these cells throughout the vertebrate series, as far as examined, is to the columnar form. A delicate reticulum (as described by Zeiss) has been observed amongst the epithelial cells. In a profile view of the epithelium *club-shaped cells* are also often seen, which are probably indicative of more or less branched cells, situate in the reticulum. The only form of basement-membrane

* "Phil. Trans.," vol. 166, p. 557.

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observed has been a delicate layer of connective tissue between the epithelium and the endothelium of the lymphatics, in which the capillaries ramify.

(3.) *Contents of Vesicles.*—The following are the chief constituents of these which have been observed in the microscopical examination of specimens hardened in alcohol:—

(*a.*) *Homogeneous* or *granular material* ("colloid substance" of authors) has been observed with slight variations, in all classes of the vertebrata, and is undoubtedly a normal product of the organ.

(*b.*) *Red Blood-corpuscles* are frequently found in the vesicles in greater or less number, and in various stages of disintegration and decolorisation. In the epithelial wall of vesicles containing red blood-corpuscles granules of yellow pigment are sometimes seen which appear to be due to the absorption, by the epithelial cells or intercellular reticulum, of the colouring matter of the effused blood. Observations on the dog lead to the inference that in this animal an escape of red blood-corpuscles is almost constantly taking place into a greater or less number of vesicles, and its occurrence in other animals also (man, tortoise, conger-eel) renders it very probable that the passage of red blood-corpuscles into the vesicles is a normal occurrence in the thyroid gland. Further observations (dog, rook, seal) also make it very probable that normally under certain circumstances an escape of red blood-corpuscles takes place into a large proportion of the vesicles of the thyroid gland. The blood thus effused contributes, the author considers, to a large extent to the formation of the "colloid" substance, and probably has an important bearing on the physiology and pathology of the organ.

(*c.*) *Colourless blood-corpuscles* (large round cells, with granular cell-substance and single round or oval-shaped nucleus) are frequently seen in the homogeneous material in the gland-vesicles of the tortoise. The migration of these cells into the vesicles is a normal occurrence in this animal. It may also take place in other animals.

(*d.*) *Rounded masses* staining darkly with hæmatoxylin, or of a bright yellow colour with picro-carminate of ammonia, are seen in the vesicles of many animals. *Crystals* sometimes occur in the gland-vesicles (tortoise, rook), and finally brown *pigment granules* have been observed in the colloid material contained in the vesicles (frog, conger-eel).

(4.) *Parenchyma.*—The parenchymatous cells already described in the adult dog have been observed in the glands of dogs a few weeks old. In the cat parenchymatous cells have been seen in less numbers, and they appear to migrate into the vesicles in the same manner as in the dog. In the pigeon large groups of round or oval-shaped cells, provided with a single nucleus, are frequently seen, but there is no evidence to show that they migrate into the vesicles.

(5.) *Lymphatics and their Contents.*—A network of lymphatics, resembling, in its general characters, that previously described in the dog, but differing apparently in the extent of its ramifications, has been observed in some other mammals. The homogeneous or granular contents of the lymphatics in the dog occur in both injected and in uninjected glands, and in very variable quantity, the amount being apparently independent of the sex or age of the animal. In the thyroid gland of the pigeon no system of lymphatics could be injected by the method of puncture after repeated attempts, but the injecting fluid always entered the blood-vessels of the gland. The thyroid gland of the tortoise contains a network of lymphatics of which the smaller ramifications run between almost all individual vesicles. The endothelium of these lymphatics presents well-marked areas of varying size and shape, stained darkly with nitrate of silver. In the thyroid gland of the conger-eel no evidence of a system of lymphatics was obtained by interstitial injection.

(6.) *Blood-vessels.*—The arteries are ensheathed more or less completely in their accompanying lymphatics (dog, tortoise). The capillaries, on the contrary, run between the epithelium of the vesicles and the smallest ramifications of the lymphatics (tortoise), leaving intervals between them where the lymphatic is not separated from the epithelium by blood-vessels. Projections of the capillaries between the epithelial cells towards the cavity of the vesicles are frequently seen in the tortoise. In the pigeon the intervesicular ramifications of the blood-vessels are not so complicated nor so minute as in other animals (*e.g.*, tortoise, sheep), but resemble more the distribution of lymphatics in some mammals. In birds also the veins frequently surround either partially or entirely the arteries which they accompany.

(7.) *Undeveloped Portions.*—Bodies consisting of portions of the gland of which the development has not advanced beyond the stage of convoluted "cylinders of cells," described by W. Müller, are frequently seen. They consist of a solid mass of more or less cylindrical rows of cells, between which run septa of connective tissue and blood-vessels. The "cylinders" are composed of cells resembling epithelial cells, cubical or columnar in shape; those on the surface of the cylinder, next to the capillaries, being arranged at right angles to those vessels. In the adult dog these undeveloped portions usually form distinct bodies separated by layers of connective tissue from the rest of the gland, and frequently lying in depressions on the surface of the organ. In young animals, such as the kitten, they can be observed undergoing a transformation into gland-vesicles.

(8.) *Thyroid Gland of the Frog.*—In opposition to the statements of most authors, but in general agreement with those of W. Müller, the thyroid gland of this animal has been found to consist of two distinct bodies, situate one on either side, on the ventral surface of the

hyoid cartilage (or bone) usually, but not always in direct contact with that structure. They are placed either between the hyoid cartilage and the hyoglossus muscles, or else immediately to the outer side of the latter, just anterior to the point of their convergence. Their structure is similar to that of other thyroid glands. The paper is accompanied by eighteen uncoloured and two coloured drawings, illustrating the subjects described.

II. "Note to the Paper on the Structure of the Immature Ovarian Ovum in the Common Fowl and in the Rabbit." By E. A. Schäfer, F.R.S. Received November 24, 1880.

Attention was drawn in the above mentioned paper ("Proc. Roy. Soc." vol. 30, p. 239, and fig. 9) to certain peculiar bodies (pseudonuclei) in the vitellus of some immature ovarian ova of the bird, the origin and interpretation of which were left in doubt. In a paper by Rauber,* which I had not seen at the time, the bodies in question are specially noticed, and an account of them is given which agrees closely with mine. I confess, however, I should be slow to acquiesce in the opinion (which Rauber seems disposed to adopt) that they are either directly or indirectly products of immigrated white blood-corpuscles. So far as I can see they appear to be nothing else than condensations of vitelline substance.

I would further take this opportunity of mentioning that the convoluted tube delineated in fig. 35 of the paper referred to in the heading of this note is not to be supposed to represent any part of an egg-tube, but the remains of a tubule derived from the Wolffian body. It is inserted to show the distinction between the two kinds of tubes which may be met with at the same time in the ovary.

III. "Note on a Communication made to the Royal Society by Professor Roscoe, LL.D., F.R.S., 'On the Absence of Potassium in Protagon prepared by Dr. Gamgee.'" By J. L. W. Thudichum, M.D., F.R.C.P. Lond. Communicated by John Simon, C.B., D.C.L., LL.D., V.P.R.S. Received November 25, 1880.

With reference to a communication which Professor Roscoe has recently made to the Royal Society on the subject of "Protagon"

* A. Rauber, "Ueber den Ursprung der Milch und die Ernährung der Frucht im Allgemeinen." Leipzig, 1879.